REMARKS

Applicant respectfully requests reconsideration and allowance of the subject application. Claims 1-30 are pending in this application.

Rejection of the Claims

Rejections under 35 USC § 103(a)

The Office rejected claims 1-6, and 23 under 35 USC § 103(a) as being unpatentable over an article reference of Kim et al., entitled "A Thin Shell Volume for Modeling Human Hair," IEEE, May 2000, pages 104-111 (hereinafter "the Kim reference" or just "Kim") in view of U.S. Patent No. 5,764,233 to Brinsmead et al (hereinafter "Brinsmead" or "the Brinsmead reference").

Claim 7 was rejected under 35 USC § 103(a) as being unpatentable over Kim, in view of Brinsmead and further in view of Meyer, "Iterative Volumetric Textures," iMAGIS laboratorie GRAVIR/IMAG-INRIA, France, 1998, (hereinafter "the Meyer reference" or "Meyer").

Claims 8-13, 15-20, and 24-30 were rejected under 35 USC § 103(a) as being unpatentable over Kim in view of Brinsmead and further in view of U.S. Patent No. 5,758,046 to Rouet et al (hereinafter "Rouet" or "the Rouet reference").

Claims 14, 21, and 22 were rejected under 35 USC § 103(a) as being unpatentable over Kim in view of Brinsmead and further in view of Rouet and Meyer.

Claim 1

Applicant amends claim 1 to more particularly point out and distinctly claim the subject matter. The amendment does not narrow the scope of the claim, but merely clarifies it.

Claim 1, as amended, defines a method, comprising:

> generating a mesh grid representation of uncovered surfaces of an object, the mesh grid including at least one grid element;
> simulating hair by associating at least one seed with each grid element;
> generating the hair in real time, wherein at least one hair extends from each seed, at least a portion of the hair extending beyond a plurality of boundaries of the grid element; and
> smoothly transitioning in real time from close-up views to distant views of the hair by utilizing different surface detail modeling techniques associated with different sets of viewing parameters.

As pointed out in the Office Action mailed on November 17, 2004, the Kim reference does not teach generating hair in real time (Office Action, page 3, lines 9-10). Instead, the Kim reference shows a modeling technique for virtual hair-combing using hair-hair interactions. Kim's virtual hair-combing aims to generate realistic looking hair distributions, although the Kim technique leaves the general case of hair-hair interaction unsolved (page 109, "Conclusion"). Kim does not consider level-of-detail viewpoint changes, but rather models hair (for combing) by combining "the simplicity of a surface representation" with the "fine appearance details of long hair" (page 105, lines 1-4).

The Brinsmead reference provides an example of a "well-known particle system" that generates virtual hair (see Applicant's specification, page 13, lines 5-6). Even if the Brinsmead reference teaches generating hair in real time, the

Brinsmead reference does not teach or suggest the method defined in Applicant's claim 1. Neither the Kim reference, the Brinsmead reference, nor the combination of Kim in view of Brinsmead teach or suggest Applicant's method. For example, Kim and/or Brinsmead, alone or in combination, do not teach or suggest "smoothly transitioning in real time from close-up views to distant views of the hair by utilizing different surface detail modeling techniques associated with different sets of viewing parameters." Applicant maintains that there is no prior art that teaches or suggests Applicant's method including smoothly transitioning views in real time.

Thus, the Kim reference and the Brinsmead reference, alone or in combination, do not teach or suggest the method of claim 1. Applicant respectfully requests that claim 1 be allowed.

Claims 2-7, and 23

For at least the reasons set forth above with respect to claim 1, Applicant submits that dependent claims 2-6, and 23 are patentable over the Kim reference in view of Brinsmead.

Claim 7 was rejected as being unpatentable over Kim in view of both Brinsmead and Meyer ("Iterative Volumetric Textures," iMAGIS laboratorie GRAVIR/IMAG-INRIA, France, 1998). But with regard to base claim 1, Meyer does not add anything to the missing teaching of Kim and Brinsmead. Moreover, dependent claims contain the language of the claims from which they depend. Claims 2-7, and 23 depend directly or indirectly from claim 1. Therefore, claims 2-7, and 23 are also allowable.

Claim 8

Claim 8, as noted above, was rejected under 35 USC § 103(a) as being unpatentable over Kim in view of Brinsmead further in view of U.S. Patent No. 5,758,046 to Rouet et al (hereinafter "Rouet" or "the Rouet reference").

Applicant amends claim 8 to more particularly point out and distinctly claim the subject matter. The amendment does not narrow the scope of the claim, but merely clarifies it.

Claim 8 defines a storage medium comprising a plurality of executable instructions which, when executed:

> implement a modeling agent to develop a surface detail model that includes a mesh grid representation made from at least one mesh grid element, the surface detail model utilizing a modeling technique that associates at least one seed with the mesh grid element,
>
> the at least one seed being located in each mesh grid element, at least one surface detail extending from each seed so that at least a portion of the surface detail extends in a direction that has a perpendicular component to a plane formed by the mesh grid element, and
>
> wherein the modeling technique is capable of rendering the surface detail in real time in accordance with the developed surface detail model over an object surface, including smoothly transitioning in real time from close-up views to distant views of the surface detail by utilizing different surface detail modeling techniques associated with different sets of viewing parameters.

For the same reasons as explained above with respect to claim 1, the Kim and Brinsmead references, alone or in combination, do not teach or suggest Applicant's storage medium as defined in claim 8. Likewise, the Rouet reference does not teach or suggest Applicant's storage medium of claim 8, for example, Rouet does not teach or suggest a modeling technique that is "capable of rendering

the surface detail in real time in accordance with the developed surface detail model over an object surface, including smoothly transitioning in real time from close-up views to distant views of the surface detail by utilizing different surface detail modeling techniques associated with different sets of viewing parameters."

Thus, the Kim reference, the Brinsmead reference, and the Rouet reference, alone or in combination, do not teach or suggest the storage medium of claim 8. Applicant respectfully requests that claim 8 be allowed.

Claims 9-14, 24, and 28

For at least the reasons set forth above with respect to claim 8, Applicant submits that dependent claims 9-14, 24, and 28 are patentable over the Kim reference in view of both Brinsmead and Rouet.

Claim 14 was rejected as being unpatentable over Kim in view of Brinsmead, Rouet, and also Meyer. But with regard to base claim 8, Meyer does not add anything to the missing teaching of Kim, Brinsmead, and Rouet. Also, dependent claims contain the language of the claims from which they depend. Claims 9-14, 24, and 28 depend directly or indirectly from claim 8. Therefore, claims 9-14, 24, and 28 are also allowable.

Claim 15

Claim 15 was rejected under 35 USC § 103(a) under the same reasons as set forth for in the Office Action for claim 8, that is, as being unpatentable over Kim in view of Brinsmead further in view of Rouet.

Applicant amends claim 15 to more particularly point out and distinctly claim the subject matter. The amendment does not narrow the scope of the claim, but merely clarifies it.

Claim 15 defines an apparatus, comprising:

> a modeling agent, to develop a surface detail model utilizing a modeling technique appropriate for a given set of viewing parameters; and
>
> a rendering engine, responsive to the modeling agent, capable of rendering surface detail in real time with smooth transitions from close-up views to distant views in accordance with the developed surface detail model over an object surface, the render engine including a mesh grid representation made from at least one mesh grid element, the surface detail model associating at least one seed with the mesh grid element, the at least one seed being located in each mesh grid element, at least one surface detail extending from each seed in a direction that has a perpendicular component to a plane formed by the mesh grid element such that at least a portion of the surface detail extends outwardly from the boundaries of the mesh grid element.

For the same reasons as explained above with respect to claim 8, the Kim, Brinsmead, and Rouet references, alone or in combination, do not teach or suggest Applicant's apparatus of claim 15. For example, none of these references alone or in combination teach or suggest "a rendering engine, responsive to the modeling agent, capable of rendering surface detail in real time with smooth transitions from close-up views to distant views in accordance with the developed surface detail model over an object surface."

Thus, the Kim, Brinsmead, and Rouet references, alone or in combination, do not teach or suggest the apparatus of claim 15. Applicant respectfully requests that claim 15 be allowed.

Claims 16-22, and 25

For at least the reasons set forth above with respect to claim 15, Applicant submits that dependent claims 16-22, and 25 are patentable over the Kim, Brinsmead, and Rouet references, alone or in combination.

Claims 21 and 22 were rejected as being unpatentable over Kim in view of Brinsmead, Rouet, and Meyer. But with regard to base claim 15, Meyer does not add anything to the missing teaching of Kim, Brinsmead, and Rouet. Also, dependent claims contain the language of the claims from which they depend. Claims 16-22, and 25 depend directly or indirectly from claim 15. Therefore, claims 16-22, and 25 are also allowable.

Claim 26

Claim 26 was rejected under 35 USC § 103(a) under the same reasons as set forth for in the Office Action for claims 1 and 8, that is, as being unpatentable over Kim in view of Brinsmead as regards claim 1, and as being unpatentable over Kim in view of both Brinsmead and Rouet as regards claim 8.

Applicant amends claim 26 to more particularly point out and distinctly claim the subject matter. The amendment does not narrow the scope of the claim, but merely clarifies it.

Claim 26 defines a method, comprising:

> generating a mesh grid representation of uncovered surfaces of an object formed from a plurality of substantially planar mesh grid elements;
>
> applying a plurality of surface detail seeds to each planar mesh grid element, at least one surface detail seed being located in each planar mesh grid element; and

generating surface detail elements in real time to extend from each seed in a direction such that at least a portion of a simulated surface detail element extends outwardly from the boundaries of the planar mesh grid element; and

smoothly transitioning in real time from close-up views to distant views of the surface detail elements by utilizing different surface detail modeling techniques associated with different sets of viewing parameters.

For the same reasons as explained above with respect to claim 1 and 8, the Kim, Brinsmead, and Rouet references, alone or in combination, do not teach or suggest Applicant's apparatus of claim 26. For example, none of these references alone or in combination teach or suggest "smoothly transitioning in real time from close-up views to distant views of the surface detail elements by utilizing different surface detail modeling techniques associated with different sets of viewing parameters."

Thus, the Kim, Brinsmead, and Rouet references, alone or in combination, do not teach or suggest the apparatus of claim 26. Applicant respectfully requests that claim 26 be allowed.

Claims 27 and 29-30

For at least the reasons set forth above with respect to claim 26, Applicant submits that dependent claims 27 and 29-30 are patentable over the Kim, Brinsmead, and Rouet references, alone or in combination. Dependent claims contain the language of the claims from which they depend. Claims 27 and 29-30 depend directly or indirectly from claim 26. Therefore, claims 27 and 29-30 are also allowable.

CONCLUSION

Applicant respectfully suggests that claims 1-30 are in condition for allowance and requests reconsideration and issuance of the subject application. Should any matter in this case remain unresolved, the undersigned attorney respectfully requests a telephone conference with the Examiner to resolve any such outstanding matter.

Respectfully Submitted,

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